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THE STATUS OF *MINERVA ANTIQUA*, *AQUILA FEROX* AND *AQUILA LYDEKKERI* AS FOSSIL BIRDS

By Alexander Wetmore

In study of fossil bird material in the American Museum of Natural History, R. W. Shufeldt in 1913 named three species that he considered fossil eagles,[1] namely, *Aquila antiqua*, *A. ferox*, and *A. lydekkeri* from the Bridger formation of the Eocene. Later[2] he decided that the first mentioned was an owl and set up the genus *Minerva* for it so that it became *Minerva antiqua*.

The fragmentary material on which these forms were based has appeared to me of doubtful identity, but until now there has not been opportunity for consideration of the species concerned except as they have come to attention in literature. Recently through Dr. Walter Granger the type specimens have been sent to me for study with results that are highly interesting.

The type of *Aquila antiqua*[3] (A. M. 5163) is a claw, with the point broken away. Its principal peculiarity is the considerably elongated articular surface that describes the arc of a semicircle. On examination this claw proves to be from the foot of an edentate mammal, a conclusion in which I have been assisted by Dr. C. L. Gazin of the U. S. National Museum. The specimen is accompanied by an ungual phalanx bearing the same catalog number which is not mentioned by Shufeldt. This also is from an edentate mammal as is shown by the form of the deeply incised groove on the distal articular surface. *Minerva antiqua*, therefore, is to be eliminated from the avian list and transferred to the Mammalia.

The type of the second of these species, *Aquila ferox*[4] (A. M. 5164), is a nearly complete claw, only the distal point being broken away. It also is from an edentate mammal, quite probably from the same species as *Minerva antiqua*, a conclusion in which also I have the concurrence of Dr. Gazin. It too must be removed from the list of fossil birds and transferred to the mammals. The resemblance of this species to *Minerva*

[1] Bull. Amer. Mus. Nat. Hist., 1913, XXXII, August 4, pp. 297–298.
[2] Trans. Connecticut Acad. Arts Sci., 1915, XIX, February, p. 43.
[3] 1913. *Aquila antiqua* Shufeldt, Bull. Amer. Mus. Nat. Hist., XXXII, August 4, p. 297, from the Bridger Eocene of Church Buttes, Wyoming.
[4] 1913. *Aquila ferox* Shufeldt, Bull. Amer. Mus. Nat. Hist., XXXII, August 4, p. 297, from the Bridger Eocene of Henry's Fork, Wyoming.

antiqua has been noted by Dr. Hildegarde Howard[1] from the original descriptions without advantage of examination of the material.

The case of *Aquila lydekkeri*[2] (A. M. 5165) is somewhat more complicated. The type material is composite, including a claw and three fragmentary phalanges from an edentate mammal, the distal end of a tibio-tarsus, the proximal end of a metatarsus, two bits from a femur, and a claw, from one or more species of birds, together with some miscellaneous fragments of uncertain identity.

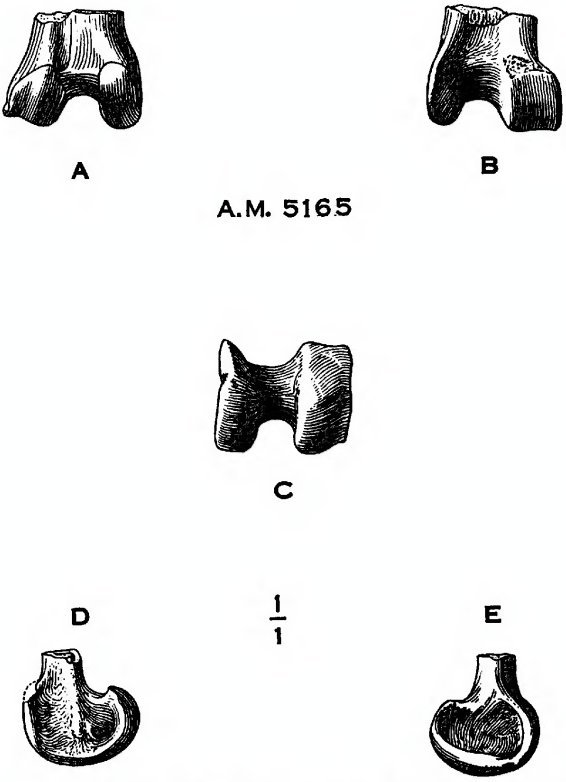

Fig. 1. *Protostrix lydekkeri* (Shufeldt). Type A. M. 5165. Distal end of tibio-tarsus. A. Anterior view; B. Posterior view; C. Distal end; D. Inner face; E. Outer face. Natural size.

After some study it appears that the distal end of the tibio-tarsus is the only avian specimen that may be successfully identified, it coming from a highly peculiar owl-like form. In the original description Shufeldt gives a general account of all this material without figuring any of it or

[1] 1932. Carnegie Institution of Washington Publ. 429, Oct., pp. 32–33, 75.
[2] 1913. *Aquila lydekkeri* Shufeldt, Bull. Amer. Mus. Nat. Hist., XXXII, August 4, p. 298, from the Bridger Eocene of Lower Cottonwood Creek, Wyoming.

selecting any one specimen as type. After due consideration, to save this name I have selected the fragmentary bit of a tibio-tarsus as the type of *Aquila lydekkeri*.

For the species represented I propose the genus

Protostrix, gen. nov.

CHARACTERS.—Distal end of tibio-tarsus (fig. 1) generally similar to *Bubo*[1] but external condyle relatively much narrower; internal condyle much broader, with external margin flaring so that the outer part of the articular surface is shallowly grooved; on anterior face the external condyle not extended up the shaft as far as the internal condyle, instead of the reverse; a distinct tubercle on the outer face of the internal condyle for tendinal attachment; distal end of shaft less excavated on anterior face.

TYPE.—*Aquila lydekkeri* Shufeldt (part), which becomes *Protostrix lydekkeri* (Shufeldt).

DISCUSSION.—The intercondylar sulcus is deep, with the external condyle viewed from in front uniform in width back to the center of the sulcus, where it narrows to terminate in a flange-like process; outer surface excavated with the rounded edge of the articular surface projecting out over it; internal condyle broad and heavy and of nearly uniform width throughout, rising abruptly from the intercondylar sulcus; inner margin rounded, this slightly beveled articular surface extending outward to be flared upward slightly toward the external margin; on anterior face this condyle not extending as far up the shaft as the outer one; external face of this condyle irregularly excavated, with an elongated tubercle at its center that extends up onto the shaft; anterior face of lower end of shaft slightly excavated above the intercondylar sulcus; the two condyles generally similar in external contour. Bone well fossilized, in color, neutral gray, varied with an ashy white cast from adherent matrix.

The specimen has the following measurements: transverse breadth of lower end of shaft 11.8 mm., antero-posterior diameter of condyles 12.9 mm., greatest width of external condyle 4.6 mm., greatest width of internal condyle 6.3 mm.

While resembling modern owls of the order Strigiformes in lack of a supra-tendinal bridge, in similarity in size and outline of the two condyles, and in their position relative to one another, this bird differs from all in the lessened depression on the lower end of the anterior face of the

[1]1806. *Bubo* Duméril, Zool. Analytique, p. 34. Type, *Strix bubo* Linnaeus

shaft, in the concave outline of the outer articular surface of the anterior condyle and in the tubercle on the outer face of the internal condyle. On these grounds it is placed in a separate family, the **Protostrigidae**, in the order Strigiformes. The tubercle mentioned is an approach to what is found in many other groups of birds. Dr. Hildegarde Howard[1] also has commented on the strigine form of this tibio-tarsus as indicated by Shufeldt's statement regarding it.

Whether any of the other avian fragments associated with the selected type are from *Protostrix lydekkeri* is problematical because of their fragmentary condition. The writer ventures no opinion on this question.

There remains to consider the status of the fossil owl that I named *Minerva saurodosis*[2] some years ago from deposits of the Bridger Eocene near Fort Bridger, Wyoming. This is an owl-like form described from the distal end of a humerus intermediate in size between the barred owl *Strix varia* and the great horned owl *Bubo virginianus*. The bone is generally similar in outline to the same part in modern owls but differs appreciably in the lesser development of the trochlea and of the points of tendinal attachment in general.

From its peculiarities it may be placed in the family Protostrigidae as it is not typical of the living families Strigidae and Tytonidae. As the genus *Minerva* has been shown above to apply to a mammal since its type *Minerva antiqua* (Shufeldt) is found to be an edentate, the species *saurodosis* is left without a generic name. Comparison between *Protostrix lydekkeri* and *Minerva saurodosis* is obviously difficult as the first is based on a tibio-tarsus and the second on a humerus. Both show definite divergence from living owls and as a matter of convenience may be placed in the same genus pending additional information that will give further light on their relationship. *Minerva saurodosis* will therefore be listed as *Protostrix saurodosis* (Wetmore).

[1]1932. Carnegie Institution of Washington Publ. 429, Oct., pp. 32–33, 75.

[2]1921. *Minerva saurodosis* Wetmore, Proc. Acad. Nat. Sci. Philadelphia, LXXIII (April 6, 1922), p. 455, figs. 1–2, near Lodge-Pole Trail Crossing on Dry Creek, about 10 miles from Fort Bridger.